U.S. Department of Transportation

FEDERAL AVIATION ADMINISTRATION

Flight Attendant Duty Period Limitations and Rest Requirements
Notice of Proposed Rulemaking

Preliminary Regulatory Impact Analysis
October 2021

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Executive Summary

The Federal Aviation Administration (FAA) Reauthorization Act of 2018 (hereafter, FAARA 2018) requires an increase in the minimum rest period for flight attendants in domestic, flag, and supplemental operations who are scheduled for a duty period of 14 hours or less. Consistent with the statutory mandate, the FAA proposes to amend its regulations to require that certificate holders operating under 14 CFR part 121 give flight attendants scheduled for a duty period of 14 hours or less a scheduled rest period of 10 hours, which cannot be reduced under any circumstances. This document provides an analysis of the benefits and cost of the proposed rule.

Using either a three or seven percent discount rate, annualized costs are approximately $67 million assuming a baseline of current practices, and $118 million under a pre-statutory baseline. Present value costs range from $277 million to $308 million over 5 years (for discount rates of seven percent and three percent, respectively) under the current practices baseline, and $483 million to $539 million over 5 years (at seven percent and three percent, respectively) under a pre-statutory baseline. Benefits (which the FAA is unable to quantify) include a potential reduction in safety risks and improvements in flight attendant health that may result from increased flight attendant rest.

Note that the analysis presented in this document reflects conditions that predate the public health emergency concerning the novel coronavirus disease (COVID-19). At the time of this writing, there is uncertainty surrounding the timing of the recovery and the long-term effects from the public health emergency on the forecasted baseline for certificate holders conducting operations under part 121. The FAA will revise its regulatory impact analysis for the final rule based on any new data and information available at that time.

Background and Summary of the Regulation

Section 335(a) of the FAARA 2018 requires modification of the flight attendant duty period limitations and rest requirements to "ensure that—(A) a flight attendant scheduled to a duty period of 14 hours or less is given a scheduled rest period of at least 10 consecutive hours; and (B) the rest period is not reduced under any circumstances." This mandate requires increasing the amount of rest that certificate holders operating under part 121 must provide to flight attendants scheduled to a duty period of 14 hours or less, and removing flexibility to reduce the rest period.

The FAA proposes to amend 14 CFR § 121.467 as specified by the FAARA 2018 and proposes no other changes to its regulations. On September 25, 2019, the FAA published an Advance Notice of Proposed Rulemaking (ANPRM). The FAA received over 200 comments in response to the ANPRM.

Baseline for the Analysis

The baseline for analysis of the incremental benefits and costs of the proposed rule includes the regulations regarding flight attendant rest and existing practices, the affected entities and flight attendants, and potential safety and health risks. Again, note that the baseline presented in this document predates the COVID-19 public health emergency. It is possible that when the rule

becomes final, the actual conditions for certificate holders may differ from the information collected prior to the public health emergency.

Currently, certificate holders conducting domestic, flag, or supplemental operations under 14 CFR part 121 must provide a flight attendant scheduled to a duty period of 14 hours or less a scheduled rest period of at least 9 consecutive hours. The certificate holder may schedule or reduce the rest period to eight consecutive hours if the certificate holder provides a subsequent rest period of at least 10 consecutive hours that is scheduled to begin no later than 24 hours after the beginning of the reduced rest period. In response to the FAARA 2018 and other circumstances (including that some airlines schedule flight attendants to be synchronized with those for pilots), 12 certificate holders already schedule flight attendants for 10 hours of rest. The provision may be reflected in a certificate holder's collective bargaining agreement with the flight attendant union.

The FAA's Safety Performance Analysis System (SPAS) contains information on certificate holders conducting operations under part 121 and the number of flight attendants. Table 7 provides a summary by category of carrier.[1]

Table 1. Universe of Certificate Holders and Flight Attendants

Category	Number of Certificate Holders	Total Number of Flight Attendants	Average Number of Flight Attendants per Certificate Holder
Major	4	91,420	22,855
National	13	21,805	1,677
Passenger and Cargo	5	703	141
Regional	21	14,196	676
Total	43	128,124	2,980

NVIS = National Vital Information System
SPAS = Safety Performance Analysis System
Source: FAA Safety Performance Analysis System (SPAS), SPAS NVIS Air Operator - 12/05/2019.

Bureau of Transportation Statistics data indicate that flight attendants serve hundreds of millions of passengers on close to 10 million flights annually in the United States.[2] Flight attendants perform safety and security functions while on duty in addition to serving customers. Voluntary reports submitted by flight attendants to the Aviation Safety Reporting System indicate the potential for fatigue to be associated with poor performance of safety and security related tasks.

[1] SPAS categories are as follows: Majors: Fleet does not contain any "Cargo Only" configured aircraft; and greater than 25 percent of fleet are aircraft configured with maximum passenger capacity greater than or equal to 100 seats, and fleet size is greater than or equal to 400. Nationals: Fleet does not contain any "Cargo Only" configured aircraft, and greater than 25 percent of fleet are aircraft configured with maximum passenger capacity greater than or equal to 100 seats, and fleet size is less than 400. Regionals: Fleet does not contain any "Cargo Only" configured aircraft, and greater than or equal to 75 percent of fleet are aircraft configured with maximum passenger capacity less than 100 seats. Passenger and Cargo Only: Fleet includes "Passenger configured" aircraft and "Cargo Only" configured aircraft.

[2] Bureau of Transportation Statistics T-100 Segment (flights) and Market (passengers) data. Available online at www.BTS.gov.

For example, in 2017, a flight attendant reported almost causing the gate agent to deploy a slide, which he/she attributed to, among other causes, having been fatigued.[3] Other reports included poor response to a passenger incident and feeling pressure to work despite being fatigued.

Benefits

Any benefits of the proposed regulation would include reductions in safety risks, and any improvements in flight attendant health, that may be associated with the increase in flight attendant minimum rest periods. Flight attendants must be prepared to respond quickly to emergencies. Given the association between fatigue and job performance, it is possible that benefits of increasing the minimum flight attendant rest period might accrue through reduced safety risks. Additionally, given the potential impact of fatigue on health, the proposed rule could also result in health benefits for flight attendants.

The FAA does not have sufficient data to estimate a baseline level of safety risk associated with flight attendant fatigue. In addition, it is also difficult to estimate (and the FAA does not have sufficient data on) the impact of the proposed rule in reducing flight attendant fatigue-related performance errors (i.e., how outcomes will differ compared to under the current rest period). However, actual reductions in safety risk are unknown because they depend on the frequency which safety-oriented tasks occur, and the FAA lacks key data to measure this linkage. In addition, any safety risk that currently exists is difficult to evaluate because U.S. air carriers experience very few accidents resulting in death or serious injury. Similarly, because multiple factors affect flight attendant health, it is difficult to identify health risks specifically attributable to rest period-related fatigue and the impact of the proposed rest requirement in reducing that risk.

Costs

The FAA used data that it collects from certificate holders conducting operations under part 121 and information submitted in response to the ANPRM, as supplemented or verified through additional outreach, to estimate the costs that may be associated with the proposed rule. To better understand the ANPRM responses, the FAA conducted additional outreach to three major, three national, and three regional certificate holders in January and February 2020. This effort assisted in applying the ANPRM comment responses to estimate costs.

The FAA used this data and information to estimate incremental costs, including new hires of flight attendants, onboarding, training, travel, and modifying crew scheduling software. As some of these certificate holders implemented the proposed rest requirement around the time the FAARA 2018 was enacted or shortly thereafter, uncertainty exists regarding whether implementation occurred due to anticipation of the required rule change or other business reasons independent of regulatory action. Therefore, the FAA measures the costs of the proposed

[3] See Aviation Safety Reporting System Database Online (https://asrs.arc.nasa.gov/search/database.html) report 1452656 from May 2017.

rule from two baselines to capture the different levels of incremental effects attributable to the rule, consistent with the Office of Management and Budget's (OMB) guidelines:[4]

- Existing practices baseline – certificate holder practices at the time of the proposed rule
- Pre-statutory baseline – certificate holder practices at the time of the FAARA 2018.[5]

Table 2 shows the affected entities by category in each baseline scenario and the current number of flight attendants. The numbers of affected certificate holders (and flight attendants) are reduced under the existing practices baseline by the numbers of certificate holders that adopted the proposed rest periods at or around the time FAARA 2018 was passed.

Table 2. Potentially Affected Entities

Category	Number of Certificate Holders with Incremental Costs	Number of Flight Attendants
Existing Practices Baseline		
Major	2	41,217
National	11	19,458
Passenger and Cargo	4	437
Regional	14	6,152
Total	31	67,264
Pre-statutory Baseline		
Major	4	91,420
National	12	21,674
Passenger and Cargo	5	739
Regional	15	6,208
Total	36	120,041
1. The number of affected certificate holders does not equal the universe (total number) of certificate holders under both baselines because some carriers have implemented the rest for other reasons (e.g., regional carriers scheduling flight attendants with pilots).		

Table 3 provides the estimates of annualized and present value costs using both baselines. The key factor influencing the magnitude of the costs is the selection of the relevant baseline for the analysis. Note that uncertainties exist regarding the characterization of both baselines, as the FAA does not have complete information on existing practices or recent changes that carriers have made as a result of the FAARA 2018 or in anticipation of the rule. In addition, with respect to hires, it can be difficult to differentiate impacts due to a requirement to provide 10 hours of rest that cannot be reduced and other factors including growth or other trends. The outreach effort confirmed that the type of operations, which are specific to each certificate holder, affect the impacts.

[4] The OMB's 2003 guidance on regulatory analysis, Circular A-4, is available online at: https://obamawhitehouse.archives.gov/omb/circulars_a004_a-4/.

[5] OMB Circular A-4 requires agencies to use a pre-statutory baseline for regulatory analysis of statutory requirements (pp. 15 and 16): "In some cases, substantial portions of a rule may simply restate statutory requirements that would be self-implementing, even in the absence of the regulatory action. In these cases, you [the agency] should use a pre-statute baseline."

Table 3. Summary of Estimated Costs (Millions)

Discount Rate	Annualized Cost	5-Year Present Value
Existing Practices Baseline		
7%	$67.5	$277.0
3%	$67.3	$308.3
Pre-statutory Baseline		
7%	$117.9	$483.5
3%	$117.7	$538.9

Table 4Table 18 provides a breakout by category of certificate holder (for the seven percent discount rate scenario). The FAA modeled costs per certificate holder as a function of the certificate holder's size (number of flight attendants).

Table 5. Estimated Hiring by Category of Certificate Holder

shows the estimated increases in flight attendants across categories by baseline scenario. These results are based on the hiring needs identified by commenters that responded to the ANPRM. However, the FAA acknowledges that the input values may not be sufficiently representative of the different certificate holders in each category.

Table 4. Annualized Costs by Category of Certificate Holder (Millions, 7% Discount Rate)

Category	Number of Certificate Holders	Annualized Cost	Average Annualized Cost per Certificate Holder
Existing Practices Baseline			
Major	2	$45.3	$22.7
National	11	$17.6	$1.6
Passenger and Cargo	4	$0.3	$0.1
Regional	14	$4.2	$0.3
Total	31	$67.5	$2.2
Pre-statutory Baseline			
Major	4	$93.6	$23.4
National	12	$19.6	$1.5
Passenger and Cargo	5	$0.5	$0.1
Regional	15	$4.2	$0.2
Total	36	$117.9	$2.7

Table 5. Estimated Hiring by Category of Certificate Holder

Category	Number of Certificate Holder	Increase in Flight Attendants
Existing Practices Baseline		
Major	2	377
National	11	149
Passenger and Cargo	4	3
Regional	14	36
Total	31	565
Pre-statutory Baseline		
Major	4	836
National	12	166
Passenger and Cargo	5	4
Regional	15	36
Total	36	1,043

Uncertainty

There are a number of uncertainties in the analysis. The hiring response by major certificate holders has potentially the largest impact on costs. For example, reducing the hiring assumption for these certificate holders by half reduces estimated costs by over 30 percent. A key uncertainty exists regarding any lingering or lasting changes to the industry following the COVID-19 public health emergency and the impact on benefits and costs.

1.0 Introduction

The Federal Aviation Administration (FAA) Reauthorization Act of 2018 (FAARA 2018), enacted October 5, 2018, requires FAA to increase the minimum rest period for flight attendants in domestic, flag, and supplemental operations who are scheduled for a duty period of 14 hours or less.[6] Consistent with the statutory mandate, the FAA proposes to amend its regulations to ensure that flight attendants scheduled for a duty period of 14 hours or less are given a scheduled rest period of 10 hours, which cannot be reduced. This document provides the FAA's analysis of the impact of this regulatory change.

Note that the analysis presented in this document reflects conditions that predate the public health emergency concerning the novel coronavirus disease (COVID-19) in 2020. To the extent that there are lingering or lasting changes to the industry following the COVID-19 outbreak, the results may over- or understate benefits and costs. At the time of this writing, uncertainty exists in forecasting baseline conditions and timeframe for recovery from the public health emergency. For the regulatory impact analysis of the final rule, the FAA will consider new information and data available at that time.

1.1 Background and Summary of the Regulation

A flight attendant under 14 CFR part 121 is defined as an individual, other than a flightcrew member,[7] who is assigned by a certificate holder conducting domestic, flag, or supplemental operations to duty in an aircraft during flight time and whose duties include but are not necessarily limited to cabin-safety-related responsibilities. Section 121.391 specifies the minimum number of flight attendants required on board a flight, based on maximum payload[8] and seating capacity, for certificate holders conducting passenger-carrying operations under part 121.

A person serving as a flight attendant in part 121 operations must complete the training and qualification requirements of part 121, subparts N and O. All newly hired flight attendants must complete basic indoctrination training, crewmember emergency training, and initial or transition training on each type aircraft on which the flight attendant will be qualified to serve. Additionally, flight attendants must complete programmed hours of instruction on each group of aircraft for which they will be qualified; they must complete 8 programmed hours each for Group I reciprocating powered and turbopropeller powered airplanes, and 16 programmed hours for Group II airplanes. Flight attendants must also complete annual recurrent training. These categories of training and qualification events include specific programmed hours, as well as airplane type specific knowledge and skill requirements.

Currently, certificate holders conducting passenger-carrying domestic, flag, and supplemental operations must fulfill the duty period limitations and rest requirements in § 121.467. Per Section 121.467(b), certificate holders must provide a flight attendant scheduled to a duty period of 14

[6] Pub. L. 115-254.
[7] A flightcrew member is a pilot, flight engineer, or flight navigator. 14 CFR § 1.1.
[8] Payload is the carrying capacity of an airplane, usually measured in terms of weight.

hours or less a scheduled rest period of at least 9 consecutive hours. (Table 6 provides a broad overview of the rest requirements for duty periods great than 14 hours). This rest period must occur between the completion of the scheduled duty period and the commencement of the subsequent duty period.[9] The certificate holder may schedule or reduce the rest period to 8 consecutive hours if the certificate holder provides a subsequent rest period of at least 10 consecutive hours that is scheduled to begin no later than 24 hours after the beginning of the reduced rest period.

Section 335(a) of the FAARA 2018 requires modification of the flight attendant duty period limitations and rest requirements to "ensure that—(A) a flight attendant scheduled to a duty period of 14 hours or less is given a scheduled rest period of at least 10 consecutive hours; and (B) the rest period is not reduced under any circumstances." This mandate requires increasing the amount of rest that certificate holders operating under part 121 provide to flight attendants scheduled to a duty period of 14 hours or less and removal of the flexibility to reduce the rest period. The FAA proposes to amend § 121.467 as specified by Section 335(a) of the FAARA 2018 and proposes no other changes to its regulations.

In amending § 121.467 to fulfill the requirements of section 335(a), the FAA must conduct economic analyses pursuant to a variety of Executive Orders and other requirements. In the interest of obtaining information to conduct such analyses, the FAA published an Advance Notice of Proposed Rulemaking (ANPRM) on September 25, 2019, to solicit input from the public on the regulatory impact of the mandated changes. The FAA received over 200 comments in response to the ANPRM.

1.2 Regulatory Alternatives

In addition to the proposed rule, the FAA considered a more comprehensive review and revision of the flight attendant duty and rest regulations, similar to the revisions the FAA made in the 2012 pilot duty and rest rule (77 FR 330 (Jan. 4, 2012)). As described more fully in the preamble to the proposed rule, and in the Initial Regulatory Flexibility Analysis, the FAA rejected this alternative because of the narrow scope of the statutory mandate for rulemaking.

There are no lower cost alternatives that would meet the statutory objectives. Therefore, there was no way for FAA to consider lower cost alternatives.

1.3 Scope of the Analysis

The FAA analyzed the potential costs and benefits of the proposed rule using information submitted in responses to the ANPRM as well as additional information gathered to assist in interpreting those comments. For this analysis, the FAA analyzed impacts over a five-year period. There is a high rate of change in the industry, which responds quickly to changes in the market, and industry characteristics may differ greatly after that time. (As noted above, the

[9] Typically, the duty period for a flight attendant begins one hour before the scheduled departure time (two hours for international flights) to allow adequate time for check-in and other preflight activity (e.g., receive bulletins, crew information).

baseline for the analysis predates the COVID-19 public health emergency.) The FAA quantified and monetized impacts in year 2020 dollars.

2.0 Need for the Regulation

Currently, certificate holders conducting domestic, flag, and supplemental operations must fulfill the flight attendant duty period limitations and rest requirements in 14 CFR 121.467, in which paragraph (b) provides that a flight attendant scheduled to a duty period of 14 hours or less must be given a scheduled rest period of at least nine consecutive hours. This rest period must occur between the completion of the scheduled duty period and the commencement of the subsequent duty period. The certificate holder may schedule or reduce the rest period to 8 consecutive hours if the certificate holder provides a subsequent rest period of at least 10 consecutive hours that is scheduled to begin no later than 24 hours after the beginning of the reduced rest period.

As described above in this document (see Section 1.0 Introduction), Section 335(a) of the FAARA of 2018 requires increasing the minimum rest period given to flight attendants scheduled for a duty period of 14 hours or less in domestic, flag, and supplemental operations. Section 335(a) does not provide any discretion in this regard. The rest period must be a) at least 10 consecutive hours, and b) not reduced under any circumstances. Therefore, the FAA must revise the flight attendant rest requirements consistent with this statutory mandate.

3.0 Baseline for the Analysis

The baseline for analysis of the incremental costs and benefits of the proposed rule includes the existing regulations regarding flight attendant rest, existing implementation of the provisions of the proposed rule, the entities and flight attendants for which the proposed rule will represent a change, and the current risks associated with fatigue. This section describes this baseline.

Again, note that the baseline presented in this document reflects conditions in the industry that predate the COVID-19 public health emergency in 2020. It is possible that, when the public health emergency subsides, the actual conditions that exist in the industry prior to the proposed rule becoming a final rule are different than those that existed prior to the public health emergency. The FAA may revise the baseline based on new data and information for the regulatory impact analysis of the final rule.

3.1 Existing Regulations

Current regulations (14 CFR part 121) define a flight attendant as an individual other than a flightcrew member who is assigned to duty in an aircraft during flight time, including responsibilities related to cabin safety. Section 121.391 specifies the minimum number of flight attendants required on board a flight (Table 6) for certificate holders conducting passenger-carrying operations under part 121. Flight attendants must complete the training and qualification requirements of part 121 subparts N and O.

Table 6. Flight Attendant Rest Periods Required by Regulation

Scheduled Duty Period (hours)	Normal Minimum Rest Period (hours)	Reduced Rest Period (hours)	Subsequent Rest Period (hours)	Number of FAs Required
14 or less	9	8	10	Minimum
14-16	12	10	14	Minimum + 1
16-18	12	10	14	Minimum + 2
18-20[1]	12	10	14	Minimum + 3

1. Applicable to duty periods for one or more flights that land or take off outside the continental US.
Source: 14 CFR sections 121.467 and 135.273.

Newly hired flight attendants must complete basic indoctrination training, crewmember emergency training, and initial or transition training on each type aircraft on which they will be qualified to serve. Additionally, flight attendants must complete operating experience on each group of aircraft for which they will be qualified. Flight attendants must also continue to successfully complete annual recurrent training. These categories of training and qualification events include specific programmed hours, as well as airplane type specific knowledge and skill requirements.

Flight Attendant Rest

Currently, certificate holders conducting passenger-carrying domestic, flag, and supplemental operations must fulfill the flight attendant duty period limitations and rest requirements in 14 CFR 121.467. Section 121.467(b) provides generally that a flight attendant scheduled to a duty period of 14 hours or less must be given a scheduled rest period of at least 9 consecutive hours. This rest period must occur between the completion of the scheduled duty period and the

commencement of the subsequent duty period. The certificate holder may schedule or reduce the rest period to eight consecutive hours if the certificate holder provides a subsequent rest period of at least 10 consecutive hours that is scheduled to begin no later than 24 hours after the beginning of the reduced rest period.

The 2018 Act required modification of the flight attendant rest requirements to provide flight attendants at least 10 hours of rest that is not reduced under any circumstances. The FAARA 2018 also required certificate holders conducting operations under part 121 to submit a fatigue risk management plan (FRMP) for flight attendants to the FAA. The FRMP must include a rest scheme consistent with limitations that enable management of flight attendant fatigue, including continually assessing the effectiveness of plan implementation to improve alertness and mitigate performance errors.

Flightcrew Rest

In 2012, the FAA issued a final rule to address the risk that crewmember fatigue posed to passenger operations conducted under 14 CFR part 121 (Flightcrew Member Duty and Rest Requirements Final Rule, 77 FR 330 (Jan. 4, 2012)). Among other provisions, the rule provided flightcrew members 10 hours of rest effective 2014. Thus, certificate holders conducting operations under part 121 already require 10 hours of rest for the flightcrew.

3.2 Existing Practices

A number of airlines already schedule flight attendants 10 hours of rest and do not reduce this period of rest. The Association of Flight Attendants (AFA) and International Brotherhood of Teamsters (IBT) provided information on current practices for a number of certificate holders in their comments in response to the ANPRM[10]:

- Frontier Airlines – ratified contract including 10 hours of irreducible rest on May 15, 2019 and implemented by the July schedule month
- PSA Airlines – ratified contract including the 10 hour minimum rest language on July 15, 2019 and implemented by September 1, 2019
- Miami Air International – ratified contract including the 10 hour minimum rest language on October 12, 2018 and implemented in one month
- Horizon Air – agreed outside contract negotiations to mirror Act.
- Delta Air Lines – announced September 6, 2019 implementation for the February 2020 bid month
- Alaska Airlines, JetBlue, Omni Air, Silver Airways, Southwest, and United Airlines all schedule at or over the 10 hours minimum rest, but based on either the flight attendant or company discretion the rest can be reduced in the operation
- Most regional certificate holders are bidding schedules with 10 hour rest because the certificate holder schedules flight attendants with pilots to avoid operational issues (examples are Piedmont Airlines, Mesa Airlines, and Envoy Airlines).

[10] The comment, number FAA-2019-0770-0205, is available in the docket for the rulemaking (https://www.regulations.gov/comment/FAA-2019-0770-0205).

The Association of Professional Flight Attendants (APFA), International Association of Machinists and Aerospace Workers (IAM), and Transport Workers Union of America (TWUA) also asserted that most U.S. certificate holders would be at or near this threshold, either by contract or practice, by the end of January 2020.[11] While the specific scheduling schemes vary, they stated that Alaska, American, Delta, JetBlue, Hawaiian, Southwest, and United Airlines would schedule their crews for at least 10 hours of rest between shifts as standard practice. They state that these certificate holders account for over 90 percent of total available seat miles of certificate holders affected by the proposed rule, and their costs of compliance would be minimal.

3.3 Affected Entities

The FAA's Safety Performance Analysis System (SPAS) contains data concerning certificate holders conducting operations under part 121 and number of flight attendants. Table 7 provides a summary by category of certificate holder and Appendix A provides a detailed list. Note that the flight attendant counts in SPAS may not match other sources because these sources reflect data at a point in time [e.g., BTS (2018); docket comment FAA-2019-0770-0205[12])]. However, the FAA used the data from SPAS for consistency and notes that differences should be minimal.

Table 7. Universe of Affected Entities and Flight Attendants

Category[1]	Number of Certificate Holders	Number of Flight Attendants	Average Number of Flight Attendants
Major	4	91,420	22,855
National	13	21,805	1,677
Passenger and Cargo	5	703	141
Regional	21	14,196	676
Total	43	128,124	2,980

NVIS = National Vital Information System
SPAS = Safety Performance Analysis System
Source: FAA Safety Performance Analysis System (SPAS), SPAS NVIS Air Operator - 12/05/2019. See Appendix A.
1. Majors: Fleet does not contain any "Cargo Only" configured aircraft; and greater than 25 percent of fleet are aircraft configured with maximum passenger capacity greater than or equal to 100 seats, and fleet size is greater than or equal to 400. Nationals: Fleet does not contain any "Cargo Only" configured aircraft, and greater than 25 percent of fleet are aircraft configured with maximum passenger capacity greater than or equal to 100 seats, and fleet size is less than 400. Regionals: Fleet does not contain any "Cargo Only" configured aircraft, and greater than or equal to 75 percent of fleet are aircraft configured with maximum passenger capacity less than 100 seats. Passenger and Cargo: Fleet includes "Passenger configured" aircraft and "Cargo Only" configured aircraft.

3.4 Risks

Flight attendants serve a high number of flights and passengers annually. Table 8 shows the total traffic in 2019.

[11] See comment FAA-2019-0770-0202 in the docket for the rulemaking (https://www.regulations.gov/comment/FAA-2019-0770-0202).
[12] Available online (https://www.regulations.gov/comment/FAA-2019-0770-0205).

Table 8. Total Flights and Passengers (All Air Carriers - All Airports), 2019

Statistic	Domestic	International	Total
Flights	8,079,007	596,938	8,675,945
Passengers	811,471,793	114,965,305	926,437,098
Source: Bureau of Transportation Statistics T-100 Segment (flights) and Market (passengers) data. All numbers are for scheduled services.			

Flight attendants perform safety-related tasks while on duty in addition to serving customers. While there is no evidence that eight-hour rest periods have led to safety problems in the past, it is possible that greater rest might lead to reductions in flight attendants' fatigue, which might improve their performance of safety-related tasks. Successful performance of these duties may have an increased positive effect on the outcome of any incident or accident.

For example, Banks et al. (2009) assert that the flight attendants' professionalism and expert emergency assistance on U.S. Airways flight 1549 was critical to evacuating 150 passengers successfully from the plane floating in the Hudson River once the flightcrew successfully ditched the aircraft.[13] The NTSB determined that the performance of flight attendants while expediting the evacuation of the airplane contributed to the survivability of the accident (NTSB, 2010). In comparison, in October 2016, an American Airlines aircraft experienced an engine failure and fire on takeoff. The NTSB found that a flight attendant's deviation from company procedures, which resulted in passengers evacuating from the left overwing exit while the left engine was still operating, contributed to the one serious passenger injury (NTSB, 2018). While there is no evidence that the flight attendant's deviation was affected by fatigue, this example does demonstrate the importance of flight attendants' safety-related tasks.

Table 9 shows voluntary reports concerning flight attendant fatigue and job performance errors related to flight attendant fatigue from the last five years. These reports are only a small fraction of the total (852) reports submitted by flight attendants for any reason over this period. The reports do not reference 14 CFR § 121.467 (or that the respective flight attendants had been given a rest period of fewer than 10 hours). Further, not all describe performance errors or scenarios where the additional rest requirements proposed by this rule would have addressed the concerns raised by the reporter. Therefore, these errors likely would not have been affected by the rule. However, the summaries of these reports indicate that flight attendant fatigue exists and that the potential for poor performance of safety and security related tasks associated with flight attendant fatigue exists.

Table 9. Airline Safety Reporting System Reports, Flight Attendant Fatigue (2015 – 2019)

Report Number	Year	Description[1]
1638737	2019	Flight attendant reported that after an inhalation event of unknown origin during a delay resulted in transport to the emergency room for treatment, discharge to a hotel was at 7 hours and 30 minutes of crew rest even though the board showed a

[13] In January 2009, after takeoff from New York City, the aircraft struck a flock of geese and consequently lost all engine power.

Table 9. Airline Safety Reporting System Reports, Flight Attendant Fatigue (2015 – 2019)

Report Number	Year	Description[1]
		14 hour overnight because block in time was used instead of factoring in the events. Reported feeling pressured to continue with regularly scheduled day when should have called in fatigue because management makes any flight attendant who calls in fatigue attend a fact finding meeting.
1606406	2018	Flight attendant reported telling crew support he/she was fatigued and not fit for duty but that they said there was no one else to work the flight so if he/she didn't it would be canceled. Captain also concluded that flight attendant was not fit for duty and called crew support but they also told him that he/she was fit and needed to work the flight.
1505311	2017	Flight attendant reported door opened and slide fell out because he/she incorrectly initiated the process. Attributed incident to not having focus where it belonged, trying to keep from getting more sick and feeling the effects of fatigue after several long flight hour days.
1462669	2017	Flight attendant reported telling manager that the flight attendant crew was not legal because the crew desk was miscalculating their numbers, and the flight attendant did not feel comfortable working the trip, due to the lengthy delay, and the feeling of fatigue setting in.
1452656	2017	Flight attendant reported almost causing the gate agent to deploy a slide which he/she attributed to, among other causes (e.g., cell phone use), having been fatigued.
1446366	2017	Flight attendant reported threatening behavior from a passenger who insisted on sitting in premium economy without paying upcharge. Upon reflection, realized could have done things differently but blamed fatigue.
1371278	2016	Flight attendant reported having a reduced rest overnight due to weather, mechanicals, and a diversion, and waking from having little sleep. During flight forgot to perform the electronic PA when closing the passenger door. After landing and realizing would have to sit in the airport for about 2 1/2 hours with no rest area to try to nap, decided to call in fatigue for last flight for safety of self and customers. Flight attendant reported that they had been slowly moving around inflight and not paying attention no matter how hard they tried.
1270281	2015	Flight attendant reported that a last minute call in resulted in all 4 crewmembers being exhausted but unable to call out fatigue for fear of losing their jobs. Notified crew scheduling of not feeling safe operating the pairing but they kept them working. If there had been an emergency, did not feel they could have effectively completed any safety responsibilities.

Source: ASRS Database Online. https://asrs.arc.nasa.gov/search/database.html Accessed January, 2020 using search criteria: Date of Incident January-2015, January-2020; Reporter Function 'Flight Attendant;' and Text contains 'fatigue.'
1. Description is a summary of the full flight attendant report. See the ASRS Database Online for the full report narrative.

3.5 Uncertainty

Uncertainties regarding the baseline for the analysis include the extent to which certificate holders would manage flight attendant fatigue in the absence of the rule and the FAARA 2018. In addition, uncertainties exist concerning the extent to which other business conditions affect

flight attendant utilization, especially in light of the impact of the COVID-19 public health emergency.

4.0 Benefits Analysis

Any benefits of the proposed regulation could result from potential reductions in safety risks and any improvements in flight attendant health that might be associated with the increase in flight attendant minimum rest. This section provides a qualitative discussion of these benefits.

4.1 Safety Risk Reductions

The FAA defines a flight attendant serving in operations conducted under 14 CFR part 121 as an individual, other than a flightcrew member, who is assigned to duty in an aircraft during flight time and whose duties include activities related to ensuring cabin safety. While most tasks performed by flight attendants are not directly related to safety risks, flight attendants are also responsible for taking action during emergencies including administering first aid, conducting land and water evacuations, responding to inflight fires, managing medical emergencies, and handling passengers who threaten the safety of other passengers or might be unruly or disruptive.

Flight attendants must also be prepared to respond to situations that could threaten the safety of the passengers and the flight, including turbulent air, airplane decompression, and hijackings. They must know the location of emergency exits, fire extinguishers, first aid kits, flotation devices, oxygen masks, and emergency slides, and check emergency equipment before flight. They must assess and verify the suitability of passengers that occupy exit seating, brief the passengers on safety equipment, evacuation, and crash landing procedures, and ensure compliance with applicable safety regulations.

Flight attendant fatigue could impair performance of these duties. Benefits of increasing the minimum flight attendant rest period may accrue through reducing performance errors that could result in safety risks. For example, Table 9 in Section 2 (Baseline) highlights self-reported performance errors related to operating evacuation slides in which flight attendants mention fatigue as a potential contributing factor. However, the FAA does not collect data on performance of safety-related tasks by flight attendants on airlines that schedule or allow eight-hour rest periods as compared to those with ten-hour rest periods, so the FAA is not able to specifically estimate whether there will be any safety benefits from the rule.

4.2 Health Risk Reductions

In a study by McNeely et al., (2018), researchers found that flight attendants reported a "prevalence" of fatigue.[14] Commenters that responded to the ANPRM also cited the effects that extended shift work and long work hours can have on personal health, noted that increased problems with sleep can occur, and opined that sleep-related issues can be associated with increased medical and healthcare costs.[15] Given the potential impact of fatigue on flight attendant health, the proposed rule could result in benefits through reducing flight attendant fatigue.

[14] The authors use age-weighted standardized prevalence ratios, and find that flight attendant fatigue occurs at higher rates compared to the general population. They do not compare flight attendant fatigue to other professions, but state that future studies should compare flight attendant health with that of U.S. workers in similar occupations, such as nursing or service industry professions.

[15] For example, see comment FAA-2019-0770-0201 in the docket for the rulemaking (https://www.regulations.gov/comment/FAA-2019-0770-0201).

4.3 Estimating Benefits from Risk Reductions

In order to estimate safety and health benefits that would result from this rule, the FAA would need estimates of the following:

- Baseline risks attributable to fatigue
- Effectiveness of the proposed rule
- Value of the reduction in risk of affected outcomes.

Baseline Risks Attributable to Fatigue

The FAA does not have data to estimate a baseline level of safety risk associated with flight attendant fatigue. Although flight attendant ASRS reports identify that fatigue exists (Section

3.0 Baseline for the Analysis), these are voluntary reports and do not provide a clear picture of the total incidence of flight attendant fatigue and how that fatigue affects performance. Also, as described in the baseline section, different practices exist regarding flight attendant rest for duty periods of 14 hours or less. As a result, the number of flights and flight attendants that would be affected by increased rest under the proposed rule is likely carrier-specific. [16]

Similarly, because multiple factors affect flight attendant health, identifying the contribution of fatigue to baseline health conditions is also difficult. The FAA does not have data on this risk in the affected flight attendant population. We note that if quantification of benefits were possible, it would be necessary to measure the incremental impacts of risk reduction relative to the analogous pre-statutory and existing practices baselines to be comparable with costs. Any incremental benefits relative to existing practices, in which fewer airlines have yet to implement the 10-hour rest requirement, would be lower compared to a pre-statutory baseline.

Effectiveness of Proposed Rule

The FAA also would need data on the effect of the proposed rule on flight attendant sleep patterns and the resulting effect on job performance and health. For example, a one-hour increase in the rest period might translate into as much as one additional hour of sleep, depending on the individual. The effect of such an increase on the level of fatigue will vary by individual and might also vary for the same individual within a period of time. The proposed rule will increase the minimum rest period for shifts of 14 hours or less, however, other factors affect rest and fatigue. Therefore, more information, such as total sleep data before and after implementation, would be necessary to evaluate effectiveness of this rule. The FAA would also need information on task performance at different levels of fatigue and how that performance relates to measurable safety outcomes.

Value of Risk Reduction

The safety risks from flight attendant fatigue are the increased risk of injuries and fatalities in the event of an accident or incident. The FAA values the reductions in such risks using the value of statistical life (VSL) for fatalities, and fractions of the VSL based on the Maximum Abbreviated Injury Scale (MAIS) for injuries. The Department of Transportation guidance on valuing reductions in fatalities and injuries could be used to monetize any quantified estimates of the potential safety benefits associated with this rule (DOT, 2021).

The health risks from flight attendant fatigue include the increased risk of fatigue-related conditions. The value of reducing such risks is based on willingness to pay to avoid any health effects related to fatigue, or information to estimate a change in quality adjusted life years that could be valued using VSL. The FAA does not have data on these risks among flight attendants.

The FAA solicits information that could be used to quantify the benefits of the proposed rule.

[16] For example, in comments on the ANPRM, one certificate holder estimated its customers subject to morning rest delays for the period October 2018 to September 2019: there were a total of 4,554 flight attendants whose rest was reduced below 10 hours and an estimated 146,532 passengers impacted.

5.0 Costs

This section describes the estimation of the incremental costs of the proposed rule, including the data and information available for the analysis, methods, and uncertainties. If a certificate holder does not already schedule flight attendants for a minimum of 10 hours rest that cannot be reduced, the proposed rule would result in costs to modify schedules and costs associated with additional labor. Certificate holders would also incur additional travel and training costs for new hires. The FAA notes that the ANPRM commenters and certificate holders providing information through the outreach process described the additional labor costs in terms of new hires. These costs represent an incremental use of resources most of which would be needed due to the rule regardless of whether certificate holders are able to comply using existing flight attendants or engage in new hiring. Also, based on the ANPRM comments, the FAA did not include any additional costs above the regular ongoing costs of hiring.

5.1 Data

The FAA used data that it collects from certificate holders conducting operations under part 121 and information submitted in response to the ANPRM, as supplemented or verified through additional outreach, to estimate the costs that may be associated with the proposed rule.

FAA Data

As described in Section 3 (Baseline), FAA data provide the number and category of certificate holders conducting operations under part 121 and the number of flight attendants (see Appendix A).

ANPRM Comments

The FAA received a several comments on the ANPRM addressing the incremental costs of the increased rest provision (Table 10). As shown in Table 10, commenters both asserted substantial costs and no costs, based on information collected from members and drawn from collective bargaining negotiations. One certificate holder provided estimates for its own operations.

Table 10. Cost Information Provided by Commenters on the ANPRM

Commenter	Summary
Airlines for America[1]	$48.5m to $118.7m per year for 6 members responding to survey, reflecting:[2] 630 to 874 new hires (average 741) per carrier $2,850/flight attendant (median) to hire and onboard $7,800 initial and $900 recurring training cost/new hire $13.6 million to $19.6 million in initial and recurring travel and per diem $700,000/carrier (median) for scheduling software modification
Endeavor[3]	$205,000 initial and $203,800 recurring costs, reflecting: 8 new hires $192,000 initial and recurring new hire costs $1,500/flight attendant to hire and onboard $1,500 initial and $600 recurring training cost/flight attendant $1,000 initial and $7,000 annually for crew tracking software changes
AFA and IBT[4]	No evidence of costs for those that have implemented. May be cost savings by increasing reserve utilization rate. No training cost.

Table 10. Cost Information Provided by Commenters on the ANPRM

Commenter	Summary
	Experience shows has not required additional hiring.
APFA, IAM, and TWUA[5]	Likely to affect the reserve utilization rate first, rather than hiring. Result will be more flight attendants working above their minimum guarantee. Some may experience one-time cost to change scheduling software, likely minimal; even for significant crew scheduling changes, cost of changing software considered de minimis.

1. See comment FAA-2019-0770-0204 in the docket for the rulemaking (https://www.regulations.gov/comment/FAA-2019-0770-0204). Airlines for America's members are: Alaska Airlines, Inc.; American Airlines Group, Inc.; Atlas Air, Inc.; Federal Express Corp; Hawaiian Airlines; JetBlue Airways Corp; Southwest Airlines Co; United Airlines Holdings, Inc.; and United Service Co. Air Canada is an Associate member.
2. Survey of Airlines for America's scheduled passenger-carrying members who account for 66% of U.S. air carrier industry flight attendant population. Several Airlines for America scheduled passenger-carrying members already schedule 10 or more hours of rest for flight attendants, while also allowing for day-of operational exceptions.
3. See comment FAA-2019-0770-0157 in the docket for the rulemaking (https://www.regulations.gov/comment/FAA-2019-0770-0157).
4. See comment FAA-2019-0770-0205 in the docket for the rulemaking (https://www.regulations.gov/comment/FAA-2019-0770-0205).
5. See comment FAA-2019-0770-0202 in the docket for the rulemaking (https://www.regulations.gov/comment/FAA-2019-0770-0202).

Additional Outreach

To better understand the ANPRM responses, the FAA conducted additional outreach to three major, three national, and three regional carriers in January and February 2020. This effort assisted in applying the ANPRM comment responses to estimate costs. The information the FAA obtained from this outreach includes confidential business information. Therefore, Table 11 provides only aggregated summary results. Appendix B provides the detailed questions asked.

Table 11. Summary of Outreach Responses

Area of Inquiry	Responses
Current status of flight attendant rest	Some carriers had implemented rest consistent with the FAARA 2018 while others had not (both in and not yet reflected in collective bargaining agreements) Some carriers waiting for certainty of final rule Some carriers mentioned implementing flight attendant rest with pilot rest rule
Expected impacts for certificate holders implementing rest consistent with Act	Carriers that implemented did not need to hire No or minimal software costs Existing practices reason for little change (e.g., already scheduling flight attendants with pilots; well-staffed reserves)
Expected impacts for certificate holders that have not yet implemented rest consistent with Act	Anticipate impact on daily operations and reliability from inability to reduce rest in operation Need to hire flight attendants or increase reserves (with substantial range in estimates, if available) Need software changes (including impacts to multiple systems); also different estimates

Table 11. Summary of Outreach Responses

Area of Inquiry	Responses
	Mixed reactions from flight attendants (both appreciating added rest and concern for schedule changes) Existing practices reason for big change (e.g., scheduling 10 but reducible and used often; high existing reserve utilization)

5.2 Method

The FAA used the data and information described in the section above to estimate the following incremental costs:

- New hire wages and salaries
- New hire onboarding
- New hire training
- Incremental travel and per diem associated with new hires
- Incremental initial and ongoing software modification costs.

The FAA was unable to quantify other potential impacts that may result in costs or cost savings to individual carriers, such as time or training on new procedures or increased utilization of reserves. The extent to which any of these impacts manifest is likely unique to each certificate holder.

The FAA estimated the costs relative to two baselines:

- Existing practices – to reflect that many certificate holders have already implemented flight attendant rest consistent with the FAARA and thus will not be impacted by the proposed rule
- Pre-statutory baseline – to reflect that many certificate holders that implemented flight attendant rest consistent with the FAARA 2018 may have done so in anticipation of the FAARA 2018 or a final rule.

The FAA estimated these baselines using the information from the ANPRM comments (see Section 3) and obtained from the additional outreach described above.

New Hire Wages and Salaries

The FAA used the estimates provided by Airlines for America and Endeavor in their public comments to estimate incremental hiring needs of affected entities.[17] The FAA used the mean of the range provided by Airlines for America (741) for major carriers, calculated as a percentage increase compared to the total number of flight attendants provided (82,200, or 0.9 percent). The FAA used the low end of the range provided by Airlines for America (630/82,220, or 0.8 percent) for national carriers;[18] and the percentage increase based on the estimate from Endeavor

[17] See comments FAA-2019-0770-0204 and FAA-2019-0770-0157 in the docket for the rulemaking (https://www.regulations.gov/comment/FAA-2019-0770-0204; https://www.regulations.gov/comment/FAA-2019-0770-0157).

[18] This value is consistent with the estimate obtained from one national air carrier through outreach.

for regional carriers (0.6 percent). The FAA assumed that the incremental hiring needs for carriers in the passenger and cargo category would be similar to the estimated needs for regional carriers.

Collective bargaining agreements might specify flight attendant labor rates, which might differ based on various types of hours. However, to provide a mean estimate of the cost of new hires, the FAA used mean wages and benefits across the industry (**Error! Reference source not found.**) to calculate incremental costs associated with new hires. Commenters did not mention any other overhead costs of hiring and managing additional flight attendants, such as expanded need for supervisors or human resources personnel.

Table 12. Labor Cost, Flight Attendants -- Scheduled Air Transportation

Mean Annual Wage[1]	Total Labor Cost Including Benefits[3]
$59,230	$90,110
1. Occupation category 53-2031 Flight Attendants (BLS, 2020). 2. Wage divided by 66% to include costs of benefits based on the Employer Cost of Employee Compensation (BLS, 2020). Wages accounted for 66% and benefits accounted for 34% of the total employer cost of employee compensation of private industry workers in the transportation and warehousing sector.	

New Hire Onboarding

Commenters that indicated they would need to hire provided a cost to onboard new employees. For this analysis, the FAA used the estimate from Airlines for America ($2,850), although a median value, as representative of onboarding costs associated with onboarding any new hire for major and national certificate holders. These costs include recruiting team salary, travel, conference space, drug testing, and background checks. The FAA used the estimate from Endeavor ($1,500) as representative of onboarding costs for passenger and cargo and regional certificate holders.

New Hire Training

Commenters that indicated they would need to hire provided costs for training new employees. These costs include training pay, training salaries, per diem, hotels, meals, and materials. For this analysis, the FAA used the estimates from Airlines for America ($7,800 initial and $900 recurring), although a median value, as representative of training costs associated with new hires for major and national airlines. The FAA used the estimate from Endeavor ($1,500 initial and $600 recurring) as representative of training costs for passenger and cargo and regional airlines. Note that use of these estimates results in some double counting of flight attendant pay because mean annual wages which would reflect training pay are already accounted for in the estimated costs of new hires.

Travel, Lodging and Per Diem

Commenters that indicated that they would need to hire, and provided costs for travel, lodging, and per diem. For this analysis, the FAA used the average of the estimates (from $13.6 million to $19.6 million in initial and recurring costs) to calculate an annual cost per flight attendant of $21,600 to $22,400 per year. The estimate from Endeavor is included in other line items and therefore not distinguishable.

Software Modification

Commenters provided different estimates of costs associated with software modification, including that costs are minimal. For this analysis, the FAA used the estimate from Airlines for America ($700,000 onetime cost), although a median, as representative of costs for major airlines. The FAA used the estimate from the national carrier ($150,000 onetime cost) for national carriers. The FAA used the estimate from Endeavor ($1,000 initial and $7,000 recurring) to estimate costs for passenger and cargo and regional categories.

Summary

Table 13 provides a summary of the cost variable values. With minor exceptions, the FAA applied these unit values to model costs for potentially affected entities under the two baseline scenarios.[19]

Table 13. Summary of Cost Variable Values

Cost Component	Value	Source (see notes)
New Hires (% increase)		
Major	0.9%	1
National	0.8%	1
Passenger and Cargo	0.6%	2
Regional	0.6%	2
Onboarding ($/new hire)		
Major	$2,850	1
National	$2,850	1
Passenger and Cargo	$1,500	2
Regional	$1,500	2
Training[1] ($/new hire)		
Major	$7,800 initial; $900 annual	1
National	$7,800 initial; $900 annual	1
Passenger and Cargo	$1,500; $600 annual	2
Regional	$1,500; $600 annual	2
Travel, Lodging, Per diem ($/new hire)		
Major	$22,000	1
National	$22,000	1
Passenger and Cargo	$22,000	1
Regional	$22,000	1
Software Modification		
Major	$700,000 onetime	1
National	$150,000 onetime	3
Passenger and Cargo	$1,000 initial; $7,000 annual	2
Regional	$1,000 initial; $7,000 annual	2

Notes:
1. Based on comment submitted by Airlines for America (https://www.regulations.gov/comment/FAA-2019-0770-0204).
2. Based on comment submitted by Endeavor (https://www.regulations.gov/comment/FAA-2019-0770-0157).
3. Based on outreach.

[19] The FAA made adjustments for two air carriers to reflect confidential business information obtained as part of the additional outreach.

5.3 Results

Table 14 and Table 15 show the potentially affected certificate holders by category and baseline. Appendix C provides a detailed list by certificate holder.

Table 14. Existing Practices Baseline[1]

Category	Number of Affected Certificate Holders	Number of Flight Attendants
Major	2	41,217
National	11	19,458
Passenger and Cargo	4	437
Regional	14	6,152
Total	31	67,264
1. See Appendix B.		

Table 15. Pre-statutory Baseline[1]

Category	Number of Affected Certificate Holders	Number of Flight Attendants
Major	4	91,420
National	12	21,674
Passenger and Cargo	5	739
Regional	15	6,208
Total	36	120,041
1. See Appendix B.		

Table 16 provides the estimates of annualized and total (5-year) present value costs using both baselines. Table 17 shows the stream of present value costs; Appendix D provides the detailed streams of costs by cost component and present value calculations. Table 18 provides a breakout by category of air carrier (for the 7 percent discount rate scenario).

Table 16. Estimated Cost of Compliance (Millions)

Discount Rate	Annualized Cost	5-Year Present Value
Existing Practices Baseline		
7%	$67.5	$276.6
3%	$67.3	$308.3
Pre-statutory Baseline		
7%	$117.9	$483.5
3%	$117.7	$538.9

Table 17. Stream of Present Value Costs (Millions)

Year[1]	Existing Practices Baseline		Pre-statutory Baseline	
	7% Discount Rate	3% Discount Rate	7% Discount Rate	3% Discount Rate
1	$69.4	$72.1	$121.3	$126.0
2	$57.2	$61.7	$99.9	$107.8
3	$53.4	$59.9	$93.4	$104.7
4	$49.9	$58.2	$87.3	$101.6
5	$46.7	$56.5	$81.6	$98.7

Table 17. Stream of Present Value Costs (Millions)

Year[1]	Existing Practices Baseline		Pre-statutory Baseline	
	7% Discount Rate	3% Discount Rate	7% Discount Rate	3% Discount Rate
Total	$276.6	$308.3	$483.5	$538.9
1. FAA assumes that costs are not incurred until the year following promulgation of a final rule, and thus discounts the first year values.				

Table 18. Estimated Cost of Compliance (Millions, 7% Discount Rate)

Category	Number of Air Carriers	Annualized Cost	Average Annualized Cost per Air Carrier
Existing Practices Baseline			
Major	2	$45.3	$22.7
National	11	$17.6	$1.6
Passenger and Cargo	4	$0.3	$0.1
Regional	14	$4.2	$0.3
Total	31	$67.5	$2.2
Pre-statutory Baseline			
Major	4	$93.6	$23.4
National	12	$19.6	$1.5
Passenger and Cargo	5	$0.5	$0.1
Regional	15	$4.2	$0.2
Total	36	$117.9	$2.7

As can be seen from the tables, the selection of the relevant baseline is the key factor influencing the magnitude of the costs of the regulation. Note that uncertainties exist regarding the characterization of both baselines. The FAA does not have complete information on existing practices or recent changes that certificate holders have made as a result of the FAARA 2018. In addition, with respect to new hires, it can be difficult to differentiate impacts due to 10 hours rest that cannot be reduced and other factors, such as growth or other trends. The outreach effort confirmed that the category of operations affect the impacts.

Table 19 shows the estimated increases in the number of flight attendants across certificate holder categories by baseline scenario. Although based on the hiring need inputs the FAA received in response to the ANPRM, the results account for certificate holders that would not experience impacts. However, the results also differ from commenter claims of no hiring needs due to the air carrier specific circumstances that can result in impacts under the different baselines.

Table 19. Estimated Hiring Needs

Category	Number of Air Carriers	Increase in Flight Attendants
Existing Practices Baseline		
Major	2	377
National	11	149
Passenger and Cargo	4	3
Regional	14	36
Total	31	565

Table 19. Estimated Hiring Needs

Category	Number of Air Carriers	Increase in Flight Attendants
Pre-statutory Baseline		
Major	4	836
National	12	166
Passenger and Cargo	5	4
Regional	15	36
Total	36	1,043

5.4 Uncertainty

Uncertainties exist in the estimates of cost. For example, a number of input variables for major and national air carriers are based on median values from a survey of six airlines submitted by Airlines for America. The extent to which these values are representative of mean cost impacts in these categories is not clear. Furthermore, these estimates pre-date the public health emergency, which has significantly reduced scheduled operations in the short-term.

The primary cost driver, the additional labor costs in the form of hiring new flight attendants, is air carrier specific, depending on current practices and the characteristics of the certificate holders and markets served. To the extent that implementing the change results in lower levels of hiring than estimated, the results would overstate compliance costs. Even software modification costs may vary substantially across airlines, as evidenced by the comments on the ANPRM. The FAA acknowledges these uncertainties and solicits data and comments to refine the estimates.

To illustrate the impact of key assumptions, Table 20 shows the change in estimated costs that result under different scenarios (the Base Analysis column shows the costs presented in this document, and the Sensitivity Analysis column shows the costs that result using the alternative assumption). For example, assuming that major air carriers implement the proposed rule with half the estimated needed new hires results in 35 percent to 39 percent lower costs. In particular, if the COVID-19 public health emergency results in fewer scheduled operations over both the near and medium term, the incremental additional labor necessary to implement the 10-hour rest requirement would likely be lower. To the extent that scheduling software modifications for the rule coincides, or could be coordinated with other types of exogenous scheduling changes, they may be lower than the estimates in this analysis. Likewise, if rest period buffers need to be built into scheduled operations for other reasons, such as response to the COVID-19 public health emergency and changes in demand, it is possible that the 10 -hour minimum rest requirement may pose less of an operational constraint than the FAA assumed in this analysis. The FAA requests comment and data on these assumptions. There is uncertainty regarding hiring attributable to the rest requirement under both baseline scenarios.

Table 20. Sensitivity of Estimated Annualized Costs to Key Assumptions[1]

Assumption	Base Analysis (millions)	Sensitivity Analysis (millions)	Percent Change
Existing Practices Baseline			
Reduced increase (50% less) in flight attendant new hires for majors	$67.5	$45.7	-32%

Table 20. Sensitivity of Estimated Annualized Costs to Key Assumptions[1]

Assumption	Base Analysis (millions)	Sensitivity Analysis (millions)	Percent Change
Growth scenario (BLS[2])	$67.5	$70.1	4%
Pre-statutory Baseline			
Reduced increase (50% less) in flight attendant new hires for majors	$117.9	$72.2	-39%
Growth scenario (BLS[2])	$117.9	$124.6	6%

1. Reflects comparison of annualized cost using 7% discount rate.
2. Reflects a pre-COVID-19 public health emergency forecast of a 10% increase over 2018 to 2028 (https://www.bls.gov/ooh/transportation-and-material-moving/flight-attendants.htm).

Another factor that could affect costs is growth. The BLS (2019) forecasts a 10 percent increase in flight attendants over the period from 2018 to 2028. Because the FAA calculated labor and associated costs of the proposed rule based on percentages of current levels of flight attendants employed by part 121 carriers, increases in these levels over time would translate to greater numbers of additional flight attendants needed, which would increase the incremental costs of the rule (including the onetime onboarding and training, and the annual labor and travel costs). Because the impact of growth would be unique to each certificate holder (e.g., some certificate holders do not need to increase hiring), the base case scenario does not incorporate growth. Table 20 shows the impact of assuming the BLS growth scenario uniformly across the industry. The increase in flight attendants each year increases costs of the existing practices scenario by four percent and the pre-statutory baseline scenario by six percent.

Finally, commenters on the ANPRM have noted the potential for adverse financial or schedule impacts on flight attendants from increased hiring. These distributional impacts would again be specific to individual certificate holders and flight attendants, as well as influenced by the specifics of certificate holders' implementation plans and collective bargaining agreements.

6.0 Summary

This section summarizes the benefits and costs of the proposed rule. The FAA is unable to quantify and monetize benefits.

6.1 Benefits and Costs

The proposed rule would require certificate holders authorized to operate under part 121 to provide flight attendants scheduled for a duty period of 14 hours or less to a rest period, which is not subject to reduction, of 10 hours. Benefits of the provision include the potential reduction in safety risks that may result from flight attendant fatigue. Annually in the United States, over 128,000 flight attendants serve over one billion passengers on over 10 million flights. Additional benefits may accrue in the form of flight attendant health risk reductions from incremental increases in rest.

Table 21 summarizes the estimated cost impacts of this requirement. Annualized costs under the current practices baseline are approximately $67 million, and a present value of $277 million to $308 million over 5 years depending on the discount rate of three or seven percent. These costs reflect the current practices of certificate holders, many of whom have implemented 10-hour flight attendant rest.

The pre-statutory baseline accounts for costs to certificate holders that have already implemented the FAARA 2018. In this scenario, annualized costs are approximately $118 million, and a present value of $484 million to $539 million over 5 years depending on the discount rate.

Table 21. Estimated Cost of Compliance (Millions)

Discount Rate	Annualized Cost	5-Year Present Value
Existing Practices Baseline		
7%	$67.5	$276.6
3%	$67.3	$308.3
Pre-statutory Baseline		
7%	$117.9	$483.5
3%	$117.7	$538.9

6.2 Uncertainty and Sensitivity Analyses

Uncertainties exist concerning the base case scenarios with respect to both benefits and costs. In particular, the future effect of flight attendant rest on performance of safety and security related duties is uncertain. Moreover, the effects of the proposed rule on flight attendants' health are unclear. In addition, the effects of the proposed rule on current certificate holders' practices are indefinite.

The hiring response by major air carriers has potentially the largest impact on the estimate of costs. For example, reducing the input assumption for major air carrier by half would reduce estimated costs by over 30 percent. In comparison, increasing the baseline number of flight attendants across the industry to account for expected future growth would increase the estimated costs by about four percent to six percent.

Finally, note that the analysis presented in this document reflects conditions that predate the COVID-19 public health emergency in 2020-21. To the extent that lingering or lasting changes to the industry will occur as a result of the COVID-19 outbreak, the results may over or under state benefits and costs. For example, in resuming normal operations, additional certificate holders might implement scheduling consistent with the FAARA 2018 in conjunction with other needed scheduling changes. The same may occur with software reprogramming. Changes to baseline conditions could reduce both costs and benefits attributable to the rule.

6.3 Regulatory Alternatives

As discussed in Section 1.2, the FAA considered conducting a comprehensive review and revision of the flight attendant duty and rest regulations, but ultimately chose to propose a regulation that is solely responsive to the statutory mandate. Because the FAA rejected pursing this alternative, it did not investigate associated benefits or costs of a broader regulation.

There are no lower cost alternatives that would meet the statutory requirements. Therefore, there was no way for FAA to consider lower cost alternatives within the statutory constraints. Also, because there are no quantifiable benefits of the proposed rule, the impact of lower cost alternatives on net benefits is not clear. For example, exempting airlines that the FAA was able to identify as small businesses based on the SBA size standard would reduce the annualized cost by $505,000, but would exclude 436 flight attendants from the rest requirement.

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Appendix A. List of Certificate Holders and Number of Flight Attendants

Table 22 shows the data from the FAA's SPAS on certificate holders conducting passenger operations under part 121.

Table 22. SPAS NVIS Air Operator Record List

FAR Part	Industry Sector Code	Operator Name	Number Flight Attendants
121	Major	AMERICAN AIRLINES INC AND/OR US AIRWAYS INC	25,069
121	Major	DELTA AIR LINES INC	24,703
121	Major	SOUTHWEST AIRLINES CO	16,148
121	Major	UNITED AIRLINES, INC.	25,500
121	National	ALASKA AIRLINES AND VIRGIN AMERICA	6,036
121	National	ALLEGIANT AIR LLC	1,194
121	National	CARIBBEAN SUN AIRLINES INC	51
121	National	EASTERN AIRLINES LLC	88
121	National	FRONTIER AIRLINES INC	2,216
121	National	HAWAIIAN AIRLINES INC	2,000
121	National	JETBLUE AIRWAYS CORPORATION	5,366
121/135	National	KAISERAIR INC	15
121	National	MIAMI AIR INTERNATIONAL INC	131
121	National	SIERRA PACIFIC AIRLINES INC	12
121	National	SPIRIT AIRLINES INC	4,152
121	National	SUN COUNTRY INC	539
121	National	TEM ENTERPRISES	5
121	PaxandCargo	AIR TRANSPORT INTERNATIONAL INC	
121	PaxandCargo	ATLAS AIR INC	378
121/135	PaxandCargo	EMPIRE AIRLINES INC	14
121/135	PaxandCargo	KEY LIME AIR CORPORATION	9
121	PaxandCargo	OMNI AIR INTERNATIONAL LLC	302
121	Regional	AERODYNAMICS INC	10
121	Regional	AIR WISCONSIN AIRLINES LLC	289
121	Regional	CHAMPLAIN ENTERPRISES INC	170
121	Regional	COMPASS AIRLINES LLC	506
121	Regional	CORVUS AIRLINES INC	29
121	Regional	ELITE AIRWAYS LLC	40
121	Regional	ENDEAVOR AIR	1,390
121	Regional	ENVOY AIR INC	1,644
121	Regional	EXPRESSJET AIRLINES LLC	722
121	Regional	GOJET AIRLINES LLC	498
121	Regional	HILLWOOD AIRWAYS, LLC	14
121	Regional	HORIZON AIR INDUSTRIES INC	700
121	Regional	MESA AIRLINES INC	1,151
121	Regional	PENINSULA AVIATION SERVICES INC	18
121	Regional	PIEDMONT AIRLINES INC	231
121	Regional	PSA AIRLINES INC	1,130
121	Regional	REPUBLIC AIRWAYS INC	2,173

Table 22. SPAS NVIS Air Operator Record List

FAR Part	Industry Sector Code	Operator Name	Number Flight Attendants
121	Regional	SEABORNE VIRGIN ISLAND INC	17
121	Regional	SILVER AIRWAYS LLC	56
121	Regional	SKYWEST AIRLINES INC	3,132
121	Regional	TRANS STATES AIRLINES LLC	276

FAR = Federal Acquisition Regulation
NVIS = National Vital Information System
PaxandCargo = passengers and cargo
SPAS = Safety Performance Analysis System
Source: FAA SPAS, SPAS NVIS Air Operator - 12/05/2019.

Appendix B. Flight Attendant Rest Outreach Questions

Below are the questions the FAA asked of nine potentially affected entities.

1. Have you implemented 10 hours of flight attendant rest irreducible? If so, how?
    a. In a Collective Bargaining Agreement (CBA)?
    b. Not formalized in a CBA but scheduled (e.g., scheduling flight attendants with pilots)?
    c. Planned for future implementation (date?)?

2. If the answer to *Question 1* above is **Yes**:
    a. Did you incur costs or need to hire due to the change in rest requirements?
    b. Can you provide best estimates (or a range of estimates) of any cost impacts due to the change or planned change in rest requirement?
        i. Number of new hires?
        ii. Cost (or labor hours) to modify scheduling software directly; what activities were included in this process?
        iii. Other (e.g., training; updating SOPs, manuals or FRMPs)?
    c. Can you identify or provide any measures of beneficial impacts to your business and operations?
        i. Improvement in job performance or flight attendant health (including reduced sick or fatigue calls)?
        ii. Increased reserve utilization?
        iii. Other (e.g. increase in flight attendant retention, customer satisfaction, etc.)?
    d. Are there any specific circumstances that affected these impacts (e.g., previously implemented 10 hours reducible)?

3. If the answer to *Question 1* above is **No**:
    a. What are the biggest barriers?
    b. Can you provide estimates of the anticipated cost impacts and what activities would be needed (e.g., number of new hires, costs to modify scheduling software, need to update training/SOPs/FRMPs)?
    c. Do you anticipate that there would be positive impacts to your business (e.g., improved performance and health, cost savings/increased reserve utilization, increase in flight attendant retention, customer satisfaction, etc.)?
    d. Are there any specific circumstances affecting these anticipated impacts (e.g., study/analysis; previous experience with similar changes)?

Appendix C. List of Affected Entities by Baseline Scenario

Table 23 shows the air carriers represented in each baseline scenario.

Table 23. Potentially Affected Certificate Holders by Baseline Scenario

Industry Sector Code	Operator Name	Existing Practices Scenario	Pre-statutory Baseline Scenario
Major	AMERICAN AIRLINES INC AND/OR US AIRWAYS INC	×	×
Major	DELTA AIR LINES INC		×
Major	SOUTHWEST AIRLINES CO	×	×
Major	UNITED AIRLINES, INC.		×
National	ALASKA AIRLINES AND VIRGIN AMERICA	×	×
National	ALLEGIANT AIR LLC	×	×
National	CARIBBEAN SUN AIRLINES INC	×	×
National	EASTERN AIRLINES LLC	×	×
National	FRONTIER AIRLINES INC		×
National	HAWAIIAN AIRLINES INC	×	×
National	JETBLUE AIRWAYS CORPORATION	×	×
National	KAISERAIR INC	×	×
National	MIAMI AIR INTERNATIONAL INC		
National	SIERRA PACIFIC AIRLINES INC	×	×
National	SPIRIT AIRLINES INC	×	×
National	SUN COUNTRY INC	×	×
National	TEM ENTERPRISES	×	×
PaxandCargo	AIR TRANSPORT INTERNATIONAL INC	×	×
PaxandCargo	ATLAS AIR INC	×	×
PaxandCargo	EMPIRE AIRLINES INC	×	×
PaxandCargo	KEY LIME AIR CORPORATION	×	×
PaxandCargo	OMNI AIR INTERNATIONAL LLC		×
Regional	AERODYNAMICS INC	×	×
Regional	AIR WISCONSIN AIRLINES LLC	×	×
Regional	CHAMPLAIN ENTERPRISES INC	×	×
Regional	COMPASS AIRLINES LLC	×	×
Regional	CORVUS AIRLINES INC	×	×
Regional	ELITE AIRWAYS LLC	×	×
Regional	ENDEAVOR AIR	×	×
Regional	ENVOY AIR INC		
Regional	EXPRESSJET AIRLINES LLC	×	×
Regional	GOJET AIRLINES LLC		×
Regional	HILLWOOD AIRWAYS, LLC	×	×
Regional	HORIZON AIR INDUSTRIES INC		
Regional	MESA AIRLINES INC	×	

Table 23. Potentially Affected Certificate Holders by Baseline Scenario

Industry Sector Code	Operator Name	Existing Practices Scenario	Pre-statutory Baseline Scenario
Regional	PENINSULA AVIATION SERVICES INC	×	×
Regional	PIEDMONT AIRLINES INC	×	
Regional	PSA AIRLINES INC	×	
Regional	REPUBLIC AIRWAYS INC		×
Regional	SEABORNE VIRGIN ISLAND INC	×	×
Regional	SILVER AIRWAYS LLC	×	×
Regional	SKYWEST AIRLINES INC	×	
Regional	TRANS STATES AIRLINES LLC		×

'×' = potentially affected
PaxandCargo = passengers and cargo
Source: Number of flight attendants: FAA Safety Performance Analysis System (SPAS), SPAS NVIS Air Operator - 12/05/2019. FAA developed the baseline scenarios of potentially affected air carriers based on the data and information presented in Section 3 (Baseline).

Appendix D. Detailed Cost Calculations

Table 24 provides the detailed calculation of present value costs using a seven percent discount rate and Table 25 shows the detailed calculations using a three percent discount rate.

Table 24. 5-Year Present Value, 7% Discount Rate

Year[1]	Onetime Onboarding	Onetime Training	Onetime Software	Annual Labor	Annual Training	Annual Travel	Annual Software	Total	Discounted
Existing Practices Baseline									
1	$1,557,683	$4,162,378	$3,069,000	$50,900,966	$496,785	$13,927,240	$133,000	$74,247,052	$69,389,769
2	$0	$0	$0	$50,900,966	$496,785	$13,927,240	$133,000	$65,457,991	$57,173,544
3	$0	$0	$0	$50,900,966	$496,785	$13,927,240	$133,000	$65,457,991	$53,433,219
4	$0	$0	$0	$50,900,966	$496,785	$13,927,240	$133,000	$65,457,991	$49,937,588
5	$0	$0	$0	$50,900,966	$496,785	$13,927,240	$133,000	$65,457,991	$46,670,643
Total									$276,604,763
Pre-statutory Baseline									
1	$2,918,182	$7,880,374	$4,621,000	$94,006,381	$926,682	$19,318,968	$147,000	$129,818,586	$121,325,782
2	$0	$0	$0	$94,006,381	$926,682	$19,318,968	$147,000	$114,399,031	$99,920,544
3	$0	$0	$0	$94,006,381	$926,682	$19,318,968	$147,000	$114,399,031	$93,383,686
4	$0	$0	$0	$94,006,381	$926,682	$19,318,968	$147,000	$114,399,031	$87,274,473
5	$0	$0	$0	$94,006,381	$926,682	$19,318,968	$147,000	$114,399,031	$81,564,928
Total									$483,469,413
1. FAA assumes that costs are not incurred until the year following promulgation of a final rule, and thus discounts the first-year values.									

Table 25. 5-Year Present Value, 3% Discount Rate

Year[1]	Onetime Onboarding	Onetime Training	Onetime Software	Annual Labor	Annual Training	Annual Travel	Annual Software	Total	Discounted
Existing Practices Baseline									
1	$1,557,683	$4,162,378	$3,069,000	$50,900,966	$496,785	$13,927,240	$133,000	$74,247,052	$72,084,517
2	$0	$0		$50,900,966	$496,785	$13,927,240	$133,000	$65,457,991	$61,700,435
3	$0	$0		$50,900,966	$496,785	$13,927,240	$133,000	$65,457,991	$59,903,335
4	$0	$0		$50,900,966	$496,785	$13,927,240	$133,000	$65,457,991	$58,158,577
5	$0	$0		$50,900,966	$496,785	$13,927,240	$133,000	$65,457,991	$56,464,638
Total									$308,311,501

Table 25. 5-Year Present Value, 3% Discount Rate

Year[1]	Onetime Onboarding	Onetime Training	Onetime Software	Annual Labor	Annual Training	Annual Travel	Annual Software	Total	Discounted
Pre-statutory Baseline									
1	$2,918,182	$7,880,374	$4,621,000	$94,006,381	$926,682	$19,318,968	$147,000	$129,818,586	$126,037,463
2	$0	$0		$94,006,381	$926,682	$19,318,968	$147,000	$114,399,031	$107,832,059
3	$0	$0		$94,006,381	$926,682	$19,318,968	$147,000	$114,399,031	$104,691,319
4	$0	$0		$94,006,381	$926,682	$19,318,968	$147,000	$114,399,031	$101,642,057
5	$0	$0		$94,006,381	$926,682	$19,318,968	$147,000	$114,399,031	$98,681,609
Total									$538,884,507
1. FAA assumes that costs are not incurred until the year following promulgation of a final rule, and thus discounts the first-year values.									